

## **REMARKS / ARGUMENTS**

### **Assignee's Ownership Interest**

The Office Action objects that the submission establishing the ownership interest of the assignee is informal. A new Statement Under 37 CFR 3.73(b) is filed with this response. As indicated in this statement, it is signed by an officer of the assignee who states that he is empowered to sign the statement on behalf of the assignee.

### **Reissue Oath/Declaration**

The Office Action objects that the Reissue Oath/Declaration is defective because it must recite the corrective action to be taken. The Applicants respectfully traverse this statement. Page 1400-23 of the MPEP, first full paragraph, second sentence states, "the corresponding corrective action which has been taken to correct the original patent need not be identified in the oath/declaration". Accordingly, the Applicants submit that the Reissue Oath/Declaration filed with this application is not defective as stated in the Office Action.

### **Certificate of Correction**

The Office Action noted that corrections in a Certificate of Correction were not properly incorporated in the patent. The amendment to claim 13 made with this response incorporates those corrections.

### **Statements of the Substance of an Interview**

The Applicants wish to thank the Examiner for the opportunity to conduct a personal interview on May 20, 2003, through the Agent for the Applicants, Scott Pundsack, and General Counsel for the Assignee, Lisa Bolton.

With reference to the requirements for recording the substance of an interview pursuant to MPEP 713.04 the Applicants make the following comments:

- (a) No exhibits were shown and no demonstrations were conducted.

- (b) The claims discussed were primarily claim 15 of the Applicants' proposed amendment dated May 6, 2003. A proposed new claim 20 was also briefly discussed.
- (c) No specific prior art was discussed.
- (d) The principal proposed amendment was an amendment to claim 15 to state "the membranes are spaced apart from each other by one or more potting materials located between adjacent membranes, the potting materials extending over a portion of the outsides of the membranes near their ends so as to sealingly secure the membranes to headers and maintain the ends of the membranes in a closely spaced-apart relationship".
- (e) The principal arguments of the Applicants were that the proposed amendment to claim 15 results in a claim which does not give rise to any improper recapture. The Applicants also argued that a proposed new claim 20, which would specify that the one or more potting materials of the proposed amended claim 15 comprise a potting resin, corresponds with the second to last sentence in the Response to Arguments section found on page 3 of the Office Action mailed on April 16, 2002. This sentence notes that a declaration filed in the prosecution of the original patent discusses fibers cushioned with resin forming the flexible support. The Examiner deferred any arguments in response until she had an opportunity to discuss the proposed amendments with the SPRE responsible for this application.
- (f) No other pertinent matters were discussed.
- (g) The general result or outcome of the interview is as stated in the Interview Summary prepared by the Examiner.
- (h) There were no communications by electronic mail.

#### **Claim Rejections**

Claims 15 to 18 were rejected in the Office Action as being improper recapture of subject matter surrendered in application number 690,045, the application for the patent upon which the present reissue is based. This rejection is made in

reference to the words "each said header having said fibers spaced apart by a flexible support means having a thickness corresponding to a desired lateral space in between adjacent fibers, said support means extending over only each terminal portion of said fibers near their ends, so as to maintain said ends in closely spaced-apart relationship".

The language quoted above appears in issued claims 1 and 9 of U.S. Patent No. 5,783,083. Since that language appears in the issued '083 patent, that subject matter cannot be said to have been surrendered in application number 690,045. The quoted language was added to application number 690,045 by amendment dated January 8, 1998. The Applicants submit that the most relevant language in a claim amended in the application was, "said first header and said second header having opposed terminal end portions of each fiber sealingly secured therein". Accordingly, to the extent that the doctrine of recapture applies to the present case, the only subject matter that could be alleged to have been surrendered is a claim in which the issue of the attachment of the ends of the fibers to the headers is stated as broadly as "said first header and second header having opposed terminal end portions of each fiber sealingly secured therein".

The Applicants submit that claims 15 to 18 and new claims 19 to 22 are not an improper recapture of any subject matter surrendered in application number 690,045. The claims, as they relate to the attachment of the membranes to the headers, are not as broad as the statement appearing in any claim amended by the amendment of January 8, 1998. The claims prior to the amendment of January 8, 1998 stated only that opposed terminal end portions of each fiber were sealingly secured in the headers. Present claim 15 includes an equivalent statement and additionally states that the fibers are spaced apart from each other by one or more potting materials located between adjacent membranes. Claims 16 to 18 depend on claim 15. Thus, claims 15 to 18 are narrower than the statement referred to in the claims as they were prior to January 8, 1998 at least

in reciting that the membranes are spaced apart from each other by one or more potting materials located between adjacent membranes. New claim 19 also depends on claim 15 and further adds that the membranes are spaced apart from each other by a center-to-center distance of at least 1.2 times the outside diameter of the membranes. New claim 20 depends on claim 15 and further specifies that the one or more potting materials located between the adjacent membranes comprise a potting resin. New claim 21 includes all of the language quoted above from the issued '083 patent. New claim 22 depends on new claim 21 and adds that the flexible support means is a potting resin. Accordingly, the Applicants submit that claims 15 to 22 do not constitute any improper recapture.

In addition to the arguments above, the Applicants also respectfully submit that claims 15 to 22 have a different scope from any claim canceled or amended in application number 690,045 and therefore do not create an improper recapture for that reason as well.

For the reasons above, the Applicants respectfully submit that this application is in condition for allowance.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "**Version with markings to show changes made.**"

Respectfully submitted,

HENSHAW ET AL

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**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**In the claims:**

Please amend claims 13 and 15 and add new claims 19-22 as follows:

13. (Amended) In a process for maintaining the outer surfaces of hollow fiber membranes essentially free from a build-up of deposits of particulate material while separating a permeate from a multicomponent liquid substrate in a reservoir, said process comprising,

submerging skein fibers in an essentially vertical, cylindrical configuration within said substrate, said fibers being unconfined in a modular shell, and securely held in vertically opposed, upper and lower headers spaced-apart at a fixed distance, said fibers having substantially the same length and from at least 0.1% greater, to about 5% greater than said fixed distance, a transmembrane pressure differential in the range from about 0.7 kPa (0.1 psi) to about 345 kPa (50 psi), and length sufficiently greater than the direct distance between opposed faces of said first and second headers, so as to present said skein in a swayable configuration above a horizontal plane through the horizontal center-line of said lower header;

mounting said headers in fluid-tight open communication with collection means to collect said permeate;

flowing a fiber-cleaning gas through a gas-distribution means proximately disposed relative to said skein, within a zone beneath said skein, and contacting surfaces of said fibers with sufficient physical impact of bubbles of said gas to maintain essentially the entire length of each fibers in said skein awash with bubbles and essentially free from said build-up;

maintaining an essentially constant flux through said fibers substantially the same as an equilibrium flux initially obtained after commencing operation of said process;

collecting said permeate in said collection means; and, withdrawing said permeate,

the improvement comprising,

introducing said cleansing gas between said fibers within said skein to generate a column of said bubbles alongside and in contact with outer surfaces of said fibers; said fibers spaced apart by a flexible support means having a thickness corresponding to a desired lateral spacing between adjacent fibers, said support means extending over only each terminal portion of said fibers near their ends, so as to maintain said ends in closely ~~apart~~ spaced-apart relationship;

restricting movement of said fibers to said vertical zone defined by lateral movement of outer fibers in said skein;

vertically gas-scrubbing said fibers outside surfaces with bubbles which flow upward in contact with said surfaces;

maintaining said surfaces substantially free from said deposits of particulate matter during a period when flux through said fibers has attained equilibrium; and simultaneously, essentially continuously, withdrawing said permeate.

15. (Twice Amended) A system for treating a multicomponent liquid substrate while leaving particulate matter therein, comprising,

(e) a non-pressurized reservoir other than a shell of a module for containing the substrate;

(f) a cylindrical skein of hollow fiber filtering membranes immersed in the substrate each fiber having a length greater than 0.5 m, the fibers together providing a surface area of at least greater than 1 m<sup>2</sup> and disposed generally vertically between upper and lower cylindrical headers ~~such that with~~ (i) ~~outsides of ends of said membranes are sealingly secured to the headers in a closely spaced apart relationship~~ the headers having opposed terminal end portions of each fiber sealingly secured therein, the fibers being spaced apart from each other by one or more potting materials located between adjacent fibers, (ii) lumens of said fibers being in fluid communication with at least one permeate collection means, and, (iii) said fibers having a length

between opposed surfaces of the headers, in the range from 0.1% to 5% greater than the distance between opposed surfaces of the headers;

(g) a pump in fluid communication with said lumens of said membranes through at least one permeate collection means, said pump operable to apply a suction to the lumens of the membranes to draw a component of the substrate as permeate through said membranes while leaving particulate matter in said substrate; and,

(h) aeration means having through-passages with openings, distributed both radially and circumferentially within the skein for discharging air directly into the substrate near the base of the skein, the openings providing a column of bubbles rising from ~~near said outsides of said membranes' near the~~ base of the skein ~~lower ends~~.

19. (New) The system of claim 15 wherein the fibers are spaced apart from each other by a center to center distance of at least 1.2 times the outside diameter of the fibers.

20. (New) The system of claim 19 wherein the one or more potting materials comprise a potting resin.

21. (New) The system of claim 15 wherein each said header has said fibers spaced apart by a flexible support means having a thickness corresponding to a desired lateral spacing between adjacent fibers, said support means extending over only each terminal portion of said fibers near their ends, so as to maintain said ends in closely-spaced apart relationship.

22. (New) The system of claim 21 wherein the flexible support means is a potting resin.